220007

FLOOD INSURANCE STUDY

VILLAGE OF MORSE,
LOUISIANA
ACADIA PARISH

OCTOBER 15, 1980

federal emergency management agency
federal insurance administration

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Morse, Acadia Parish, Louisiana, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Village of Morse to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Pyburn & Odorn, Inc., for the Federal Insurance Administration, under Contract No. H-4813. This study was completed in December 1979.

1.3 Coordination

Streams requiring detailed study were identified at a meeting in May 1978 attended by representatives of Pyburn & Odorn, Inc., FIA, and the Village of Morse. Results of the hydrologic analyses were coordinated with the Louisiana Office of Public Works and the U.S. Soil Conservation Service.

On February 28, 1980, the results of the study were reviewed at the final meeting attended by representatives of the study contractor, FIA, and community officials. The study was acceptable to the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Morse, Acadia Parish, Louisiana. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed and approximate studies in Morse were determined by FIA with community and study contractor consultation at the meeting in May 1978.

The Morse Lateral, a tributary of Lazy Point Canal, was studied from south of the southwestern corporate limits eastward past the southeastern corporate limits and northward to immediately above Louisiana Highway 92. Although the stream bed is in its entirety outside of the corporate limits of Morse, its flood plain extends well within the corporate limits.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through December 1984.

2.2 Community Description

The Village of Morse is located in south central Acadia Parish in the south central portion of the State of Louisiana. The community is situated approximately 9 miles southwest of Crowley, Louisiana, and approximately 12 miles southeast of Jennings, Louisiana. The 1970 population was 759, an increase of 11 percent over the 1960 population of 682 (References 1 and 2).

The Village of Morse is primarily an agricultural community, farm land being used mainly for rice, soybeans, and rotational pasture for cattle. Much of the land in Morse remains undeveloped or is used for agricultural purposes.

The annual average temperature is about 68 degrees F, ranging from an average of 55 degrees F in the winter to an average of 82 degrees F in the summer. Annual average precipitation is 57 inches. Snowfall is rare. (References 3 and 4).

The study area has a relatively flat terrain. The relief ranges from approximately 14 feet above National Geodetic Vertical Datum of 1929 (NGVD) in the northeastern corner of the village to approximately 5 feet NGVD in the southwestern section. A leveed irrigation canal, the Ferre Canal, crosses the village from its southeastern to its southwestern corporate limits. The elevation of the levee of this canal is approximately 16 feet NGVD.

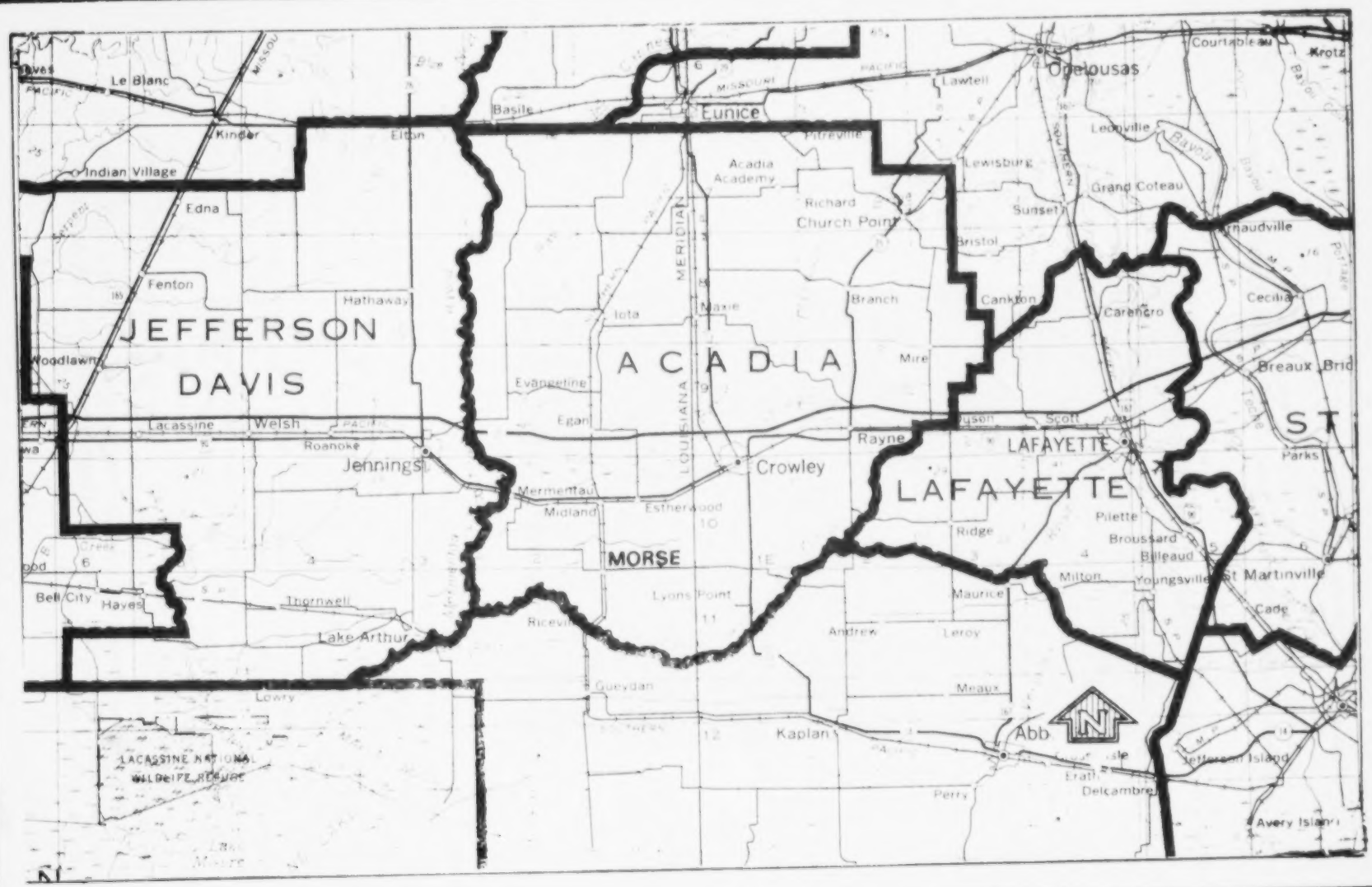


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF MORSE, LA
(ACADIA PARISH)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

While the soils along the Morse Lateral are classified as Midland silty clay loam (a deep, poorly drained, heavy soil found in depressions in the Coastal Prairie), most of the village is covered with Crowley silt loam. The Crowley silt loam is a deep, imperfectly drained, very strongly acid to mildly alkaline soil on gentle slopes and ridges in the Coastal Prairie (Reference 3).

2.3 Principal Flood Problems

Backwater flooding from the Morse Lateral and its receiving streams, Lazy Point Canal and Bayou Queue de Tortue, cause most of the flood problems for the Village of Morse. Backwater problems on the eastern side of the village are intensified by the restrictions imposed by the Southern Pacific Railroad and the Ferre Canal. The most severe flood known to have occurred in this area was in August 1940. This flood, which covered most of the village resulted from the extremely heavy rains of a tropical storm. A two-day rainfall of 29.12 inches was recorded at Crowley. The 1940 high water recorded on Bayou Queue de Tortue at Louisiana Highway 91 south of Morse was 12.8 feet NGVD. Historical accounts and analyses of gages in the area indicated that the 1940 flood peak was higher than the expected 100-year flood peak. Other floods in Morse have occurred in 1953, 1955, 1967, 1971, and 1977 (References 5 and 6).

Figures 2 and 3 show the expected 100-year and 500-year flood elevations.

2.4 Flood Protection Measures

A 10-inch diameter discharge tractor-powered low-head pump located just east of the Southern Pacific Railroad and north of Ferre Canal alleviates some local flooding problems by pumping ponded water into the irrigation canal. The levels of damaging floods, however, are not significantly affected, since pump capacity is small compared to the quantity of water involved in a 100-year storm.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-,50-,100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-,50-,100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

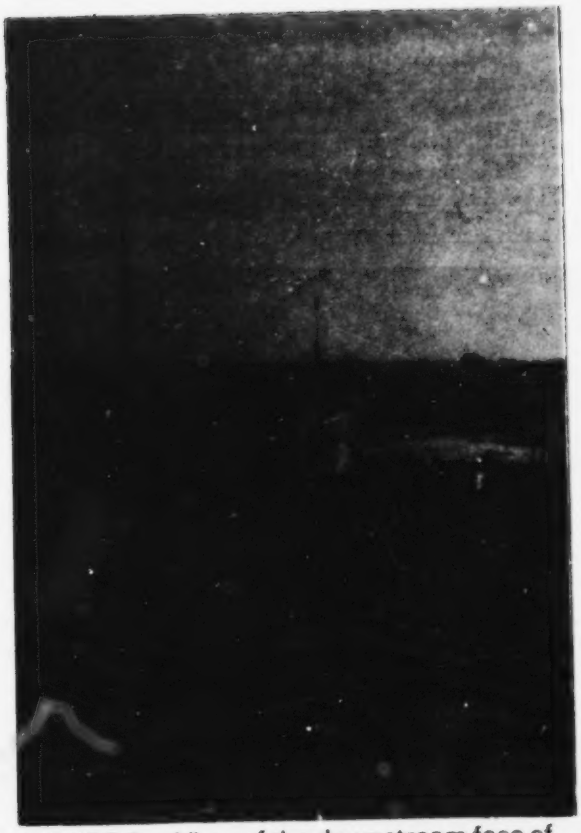


FIGURE 2: View of the downstream face of the Louisiana Highway 92 bridge over the Morse Lateral, facing northeast. The 100-year flood at this face of the bridge would reach approximately 3 feet above the culvert opening (1 foot below the top of road). The 500-year flood would reach approximately 0.5 foot above the top of the road.

FIGURE 3: View of Ferre Canal flume over the Morse Lateral. The 100-year storm would reach approximately 3.5 feet above the bottom of the 8-foot flume. The 500-year flood would reach approximately 5.5 feet above the bottom of the flume.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals.

The 10-, 50-, and 100-year peak discharges for the Morse Lateral were developed using the U.S. Geological Survey (USGS) regionalized method (References 6 and 7). The 500-year peak discharge was extrapolated from a log-probability plot of the discharge-frequency data.

A summary of drainage area-peak discharge relationships for the Morse Lateral is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MORSE LATERAL					
South of western corporate limits	3.4	360	470	520	610
At Louisiana Highway 91	2.8	320	425	470	560
Just upstream of Ferre Canal Crossing	2.1	285	375	420	510

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Cross section data for the streams in the study area were obtained by field surveys. All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Cross sections were located at close intervals upstream and downstream of bridges and culverts in order to compute significant backwater effects of these structures. The locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1).

Roughness coefficients (Manning's "n") for the computations were estimated on the basis of field inspection using Chow's book Open-Channel Hydraulics (Reference 8) for guidance. The roughness coefficient was estimated to be 0.040 for the main channel and ranged from 0.035 to 0.050 for the overbank areas.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Water-surface elevations of floods of the selected recurrence intervals were developed using the Corps of Engineers' HEC-2 step-backwater computer model (Reference 9). Starting water-surface elevations were taken from estimated profiles of Lazy Point Canal and Bayou Queue de Tortue.

All elevations are referenced from NGVD, formerly referred to as Mean Sea Level Datum of 1929 (MSL). Elevation reference marks used in this study are shown and described on the map.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps enlarged to a scale of 1 inch = 600 feet with a contour interval of 5 feet (References 10 and 11). In cases where the 100- and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

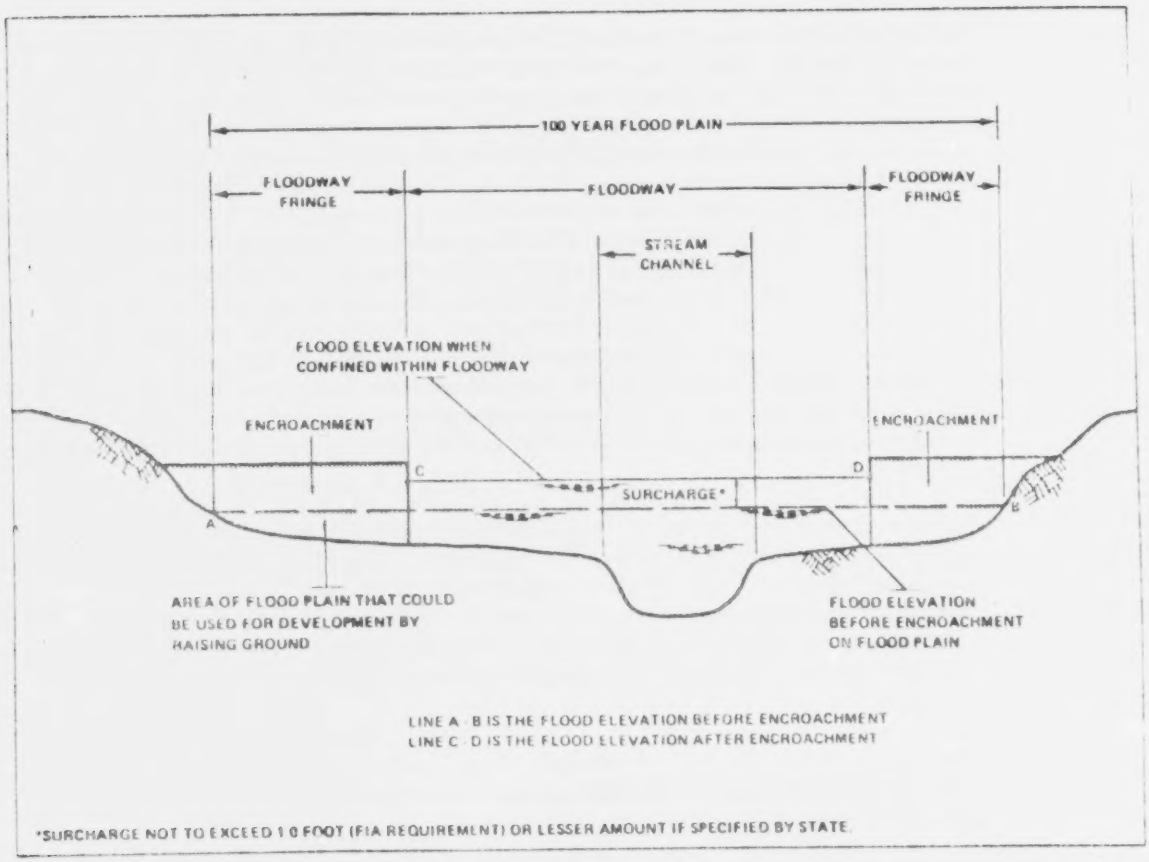
The boundaries of the 100-year and 500-year floods are shown on the Flood Insurance Rate Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations, and therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 4.

The floodway for Morse Lateral lies completely outside of the corporate limits, and therefore, is not shown.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 4

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the Village of Morse.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Two reaches meeting the above criteria were required for the flooding sources of the Village of Morse. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Village of Morse was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A2, A6:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Morse is, for insurance purposes, the principal result of the Flood Insurance Study. This map (Exhibit 2) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

In 1974, Letz Engineers of Crowley, Louisiana, prepared for Acadia Parish a "Report Covering a Brief History of Flooding in Acadia Parish, Louisiana and the Determination of the 100-year Flood Level" (Reference 5). The area in Morse shown as inundated in the Letz report is generally in agreement with that of the present study.

This study is authoritative for the purposes of the Flood Insurance Program, and data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division, Federal Emergency Management Agency, Federal Center, Denton, Texas 76201.

8.0 BIBLIOGRAPHY AND REFERENCES

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5. Letz Engineers, "Report Covering a Brief History of Flooding in Acadia Parish, Louisiana and the Determination of the 100-year Flood Level." Crowley, Louisiana. 1974.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Morse Lateral							
Reach 1	0001	-2.89	-0.98	+2.44	030	A6	11
Reach 2	*	-1.72	-0.71	+2.29	015	A3	Varies
Reach 3	0001	-0.98	-0.45	+1.45	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT SEE MAP

*Located outside of corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF MORSE, LA
(ACADIA PARISH)

FLOOD INSURANCE ZONE DATA

MORSE LATERAL

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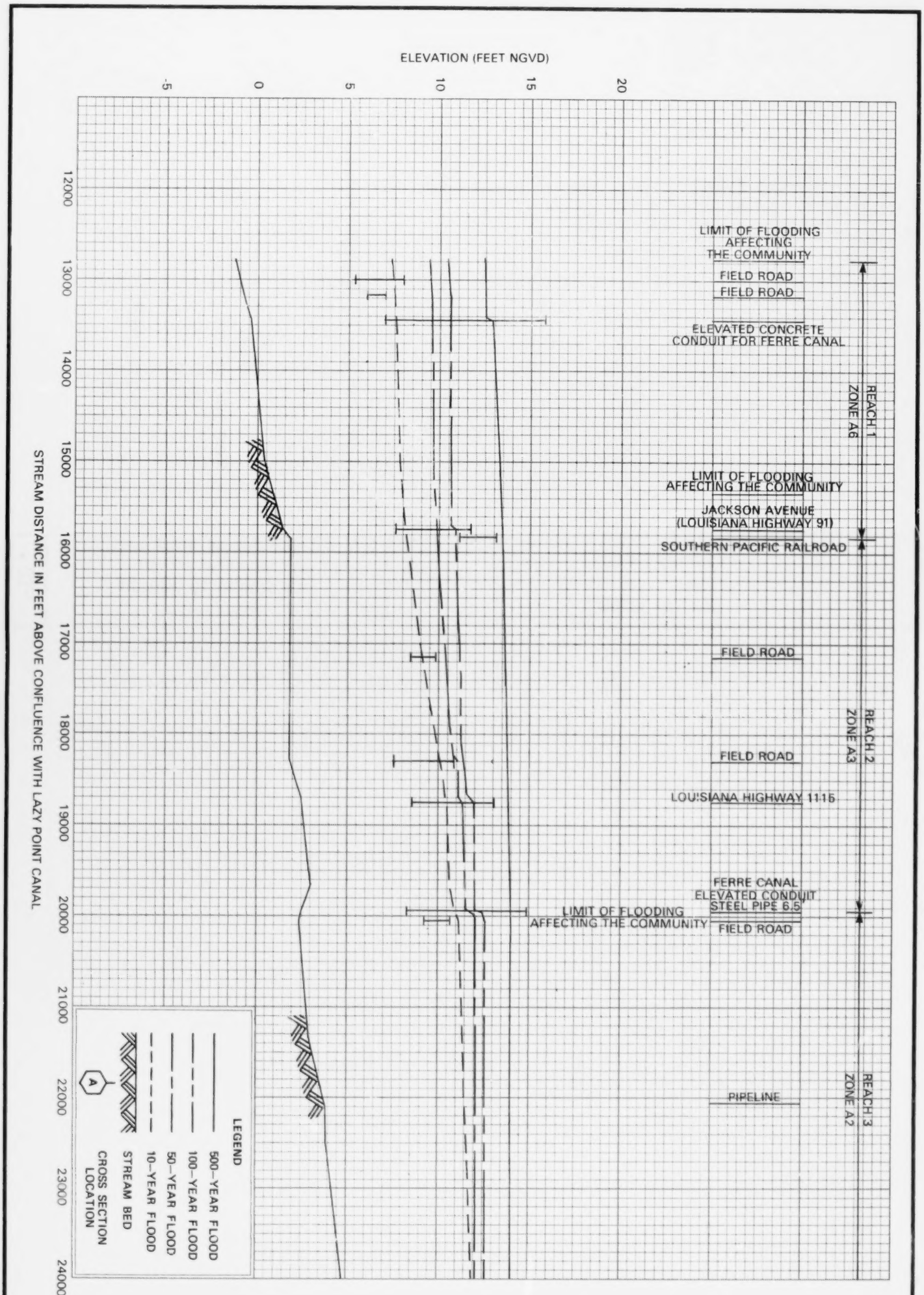
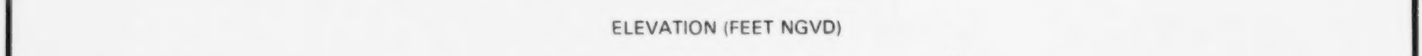


01P	FEDERAL EMERGENCY MANAGEMENT AGENCY Federal Insurance Administration **VILLAGE OF MORSE, LA** (ACADIA PARISH)	**FLOOD PROFILES** **MORSE LATERAL**



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FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF MORSE, LA
(ACADIA PARISH)

FLOOD PROFILES

MORSE LATERAL